

Isolation of azole-resistant *Aspergillus fumigatus* from the environment in the southeastern United States

Summary paragraph

A recent CDC study found drug resistance in a common soil fungus that can cause serious infections in people. This is the first time azole-resistant *Aspergillus fumigatus* has been found in the environment in the United States, although this drug-resistant fungus had been previously identified in a few U.S. patients.

Azoles, a type of antifungal medicine, are generally the first drugs used to treat invasive *Aspergillus* infection. Finding this drug-resistant fungus in the environment is concerning because it suggests that the number of azole-resistant *Aspergillus fumigatus* infections in people could increase over time as people breathe in resistant fungal spores. Healthcare providers should be aware of the possibility of azole resistance in patients with an invasive *Aspergillus* infection. Agricultural use of azoles to control fungal growth on plants may contribute to the development of azole-resistant *Aspergillus fumigatus*.

Key points

- *Aspergillus fumigatus* (*A. fumigatus*) is a common fungus found in soil. It causes serious infections in people with underlying medical conditions. *A. fumigatus* is the most common cause of *Aspergillus* infections.
- A type of antifungal drug called azoles are generally the preferred treatment for invasive infection with *Aspergillus*, which makes them important clinical drugs.
- New gene mutation in *A. fumigatus* that makes it resistant to azoles was identified recently in *A. fumigatus* in other countries. Researchers recently found this gene mutation in several azole-resistant *A. fumigatus* isolates from samples collected on a peanut farm in southeast Georgia. It's the first time this antifungal resistance has been found in U.S. agriculture.
- Healthcare providers should be aware of the possibility of azole resistance in patients with an invasive *Aspergillus* infection.
- Agricultural use of azoles to control fungal growth on plants may make *A. fumigatus* resistant to azoles.
- This finding indicates a need to look for resistant *A. fumigatus* in other agricultural areas throughout the United States.

Background information

AZOLES IN AGRICULTURE

- Azoles are routinely sprayed on many U.S. crops, both food crops and flowers. These crops include peanuts, melons, cucumbers, squash, strawberries, grapes, hops, fruit trees, turf grass, and flowers for cutting.
- Eating peanuts does not increase the chance of an *Aspergillus* infection. *Aspergillus fumigatus* does not grow on peanuts.

- The peanut plant can get infected with *Aspergillus*, as *Aspergillus* is widespread in the environment, particularly where there is compost like with peanut plants.
- The field sampled for this study was sprayed with azoles as part of an experiment on crop yields.
- CDC and a collaborator with the University of Georgia sampled this field as part of our work to look at antifungal resistance. We knew the field had been sprayed with azoles and suspected we might be able to find resistant *Aspergillus*.
- For more information about azole use in agriculture, please contact the U.S. Environmental Protection Agency.

AZOLES FOR MEDICAL USE

- A type of drug called azoles is generally the preferred treatment for invasive infection with *Aspergillus*, which makes it an important clinical drug. Before azole drugs were used, about two in three people with invasive *Aspergillus* infections died. When patients were treated with azole drugs, fewer than one in three people died.
- Infections with *Aspergillus* strains that are resistant to azoles are much harder to treat. More than two in three patients with these strains died.

ASPERGILLUS

- *Aspergillus*, a type of fungus, is common both indoors and outdoors. Most people breathe in fungal spores every day.
- It's impossible to completely avoid breathing in some *Aspergillus* spores.
- For people with healthy immune systems, breathing in *Aspergillus* isn't harmful.
- However, for people who have weakened immune systems, breathing in *Aspergillus* spores can rarely cause an infection in the lungs or sinuses which can spread to other parts of the body.
- There are about 16,000 hospitalizations in the United States each year involving *Aspergillus* infections. [[HYPERLINK "https://academic.oup.com/ofid/article/doi/10.1093/ofid/ofw268/2901057/Trends-in-Hospitalizations-Related-to-Invasive"](https://academic.oup.com/ofid/article/doi/10.1093/ofid/ofw268/2901057/Trends-in-Hospitalizations-Related-to-Invasive)].
- Invasive *Aspergillus* infection usually occurs in people who are already sick from other medical conditions, so it can be difficult to know which symptoms are related to an *Aspergillus* infection.
 - Symptoms of invasive aspergillosis in the lungs include fever, chest pain, cough, coughing up blood, or shortness of breath.
 - Only a laboratory test can determine whether a person has an *Aspergillus* infection.
- If you have a weakened immune system, take these steps to lower your chances of getting infected with *Aspergillus*.
 - Avoid dusty areas like construction or excavation sites.
 - If you can't avoid these areas, wear an N95 respirator (a type of face mask) while you're there.
 - Avoid activities that involve close contact with soil or dust, such as yard work or gardening.
 - If this isn't possible, wear shoes, long pants, and a long-sleeved shirt when doing outdoor activities such as gardening, yard work, or visiting wooded areas.
 - Wear gloves when handling materials such as soil, moss, or manure.
 - Clean skin injuries well with soap and water, especially if they have been exposed to soil or dust, to reduce the chance of developing a skin infection.

